

Title: Hats Off To You

Brief Overview:

Through the use of a hat theme in a literature connection, students will explore the collection, display, and interpretation of data with tally charts, concrete bar graphs, and pictographs. Students will work in partners, small groups, and independently, to communicate mathematical ideas and practice using mathematical vocabulary. Students will develop their understanding of concepts progressing from a concrete to a representational level.

NCTM Content Standard/National Science Education Standard:

Data Analysis& Probability

Grade/Level:

Grades 2/3

Duration/Length:

2 days for 60 minutes

Student Outcomes:

Students will:

- Sort a collection of items according to different attributes.
- Gather data in order to construct tally charts, concrete pictographs, and representational pictographs.
- Interpret the represented data.
- Use mathematical vocabulary when discussing the data displays.

Materials and Resources:

Lesson 1

- Parent communication letter requesting each student to bring in a favorite hat to wear on “Hats Off To You” day. (Student Resource 1) One per student.
- Literature connection book for oral reading. See suggested list (Teacher Resource 1).
- Post-it notes. One for each student.
- Large blank tally chart (Teacher Resource 2).
- Large poster of the Tally Chart Checklist. (Teacher Resource 3).
- Large blank tally charts. One for each group of 4 students.

- Teacher collection of hats of various types (approximately 18-24).
- Small (8x11) blank tally charts, one for each pair of students. (Student Resource 2).
- Student Tally Chart Checklist, one for each pair of students (Student Resource 3).
- Sets of small objects (12-20 in each) for re-teaching practice.
- Sets of pattern blocks and blank tally charts for extension activities.

Lesson 2

- Every-pupil-response cards: red and green square cards for each student
- Literature connection book (Teacher Resource 1)
- Tally chart form previous lesson that showed “types” of hats
- Teacher Pictograph Checklist (Teacher Resource 4)
- Graphing mat
- Teacher’s hat collection from previous lesson
- Large sheet of butcher paper for the construction of a pictograph
- Magazines- one per student
- Blank Pictograph and Pictograph Checklist (Student Resources 4-5), one for each pair of students
- Summative Assessment Student Resources 6A- 6B, one for each student

Development/Procedures:

Lesson 1

Note: Advance Preparation – Send a letter to parents requesting each student to wear their favorite hat on “Hats Off To You Day”. Student Resource 1

Pre-Assessment-

- Gather students in a large group with each student wearing their favorite hat they brought from home.
- Discuss briefly the different hats the children are wearing.
- Notice the students’ ability to identify likenesses and differences of the hats.

Launch-

- Explain that today they will read a book that has pictures of many different hats for the purpose of gathering and interpreting data.
- Choose a book to read orally to the class. Teacher Resource 1.
- Give each student a post-it note and have him or her write one thing or attribute that they notice about the hats in the story.
- Group the responses on the chalkboard according to attributes such as color, size, shape, and function.

Teacher Facilitation –

- Use the data from the post-it notes to construct a large tally chart (Teacher Resource 2).
- Discuss what the data on the chart shows. For example: four hats are green, more hats are shiny, etc.
- Have students take a few minutes to share information about their hat with a partner.
- Explain to students that now we will construct a new tally chart using data from the hats they are wearing.
- Have students put their hats into a large group and discuss the attributes or ways of sorting the hats.
- Construct with the students a tally chart showing data from observations of the hats according to type.
- Ask: *Which hats could we group together because they are alike in some way?*
- Identify the components of a tally chart by displaying and using Teacher Resource 3.
- Interpret the data displayed on the tally chart by discussing the following questions: *What do you notice about the total number of hats in the different categories? Is one type of hat more popular than another? How do you know? What can you tell about the total number of tallies? If we added my hat to the group how would that change the tally chart?*
- Have students respond to questions with a *thumb up* or a *thumb down* to observe student understanding.
- Allow students the opportunity to pose a question to the class using the data from the tally chart.

Student Application –

- Have students work in small groups to construct a new tally chart using the same set of data but using color as the category. Use Student Resource 2 and 3.
- Allow one or more groups as time permits, to present their tally chart to the class.
- Note the accuracy of the data and the ability to construct a complete tally chart.
- Allow students the opportunity to generate conclusions about the data displayed.

Embedded Assessment –

- Present a new collection of hats (18-24).
- Allow students to work in pairs to construct a tally chart depicting the data accurately. Students may determine their categories. Student Resource 2.
- Allow pairs of students to share results.
- Note the students' ability to communicate using mathematical vocabulary.
- Collect this sheet for an assessment record.

Reteaching/Extension –

- Provide opportunities for students who are experiencing difficulties to sort, count, and tally small groups of objects without making a tally chart.
- Give students who understand the lesson a set of pattern blocks and have them construct two tally charts, one based on color and one based on shape. Have the students write what they notice about the two charts. (They should be the same). Ask them to explain why this happened.

Lesson 2**Pre-Assessment –**

(Same format as Lesson 1 above)

- Distribute every pupil response card (red and green) for each student.
- Gather students together into a large group and display the tally chart from the previous lesson that displays the data of hats according to color.
- Ask students various questions to review the concept of construction and interpretation of a tally chart and have them respond with a show of their every-pupil-response card. For example: *Does a tally chart need a title? Does the total number of tallies equal the total number of objects? Are any categories equivalent?*

Launch –

- Explain that today they will continue their hat theme by reading another selection. Ask students to take notice of the new hats and think about how they might compare to the hats in the previous story.
- Read the new story to the student.
- Discuss ways that the hats could be sorted and counted. Students may say that they could make a tally chart like yesterday.

Teacher Facilitation –

- Display the class tally chart from yesterday that showed types of hats. (Data gathered from the teacher's hat collection.)
- Review conclusions about the data displayed on the chart.
- Explain that there is another way to display the data.
- Use the graphing mat to demonstrate how to make a concrete pictograph that matches the data on the tally chart.
- Use Teacher Resource 4 to describe and identify the parts of a pictograph.
- Have students explain the likenesses and differences between the tally chart and the concrete pictograph.
- Show students a large tally chart that displays hat data according to color.
- Have students work along with the teacher to make a large pictograph on chart paper. Use the Teacher Resource 4 to make sure all appropriate parts of the pictograph are included.
- Discuss the data display and have students be aware that although the displays are different, the data is the same.
- Ask students to explain which way they like to see the data and why.

Student Application –

- Explain that now students will have the opportunity to work with a partner to use materials and construct their own pictograph about hats.
- Distribute a magazine and Student Resources 4 and 5 to each student and divide the class into partners.
- Allow students approximately 15 minutes to cut and paste pictures of hats onto Student Resource Sheet 4 to construct a pictograph.
- Direct students to use their checklist (Student Resource 5) to make certain their pictograph is complete.
- Allow students to share their pictographs by combining partner pairs and explain what their data shows.
- Encourage students to ask each other questions about their pictographs.

Embedded Assessment –

- Collect the student constructed pictographs
- Gather students together and choose 2 pictographs to compare the data.
- Ask such questions as, *which graph shows more data? How are the pictographs the same? How are the pictographs different? What question could you ask about the data from a particular graph?*

Reteaching/Extension –

- Provide opportunities, for students who are having difficulty transferring from the concrete graph to the representational pictograph, to make more concrete pictographs on the graphing mat. Some examples of objects are plastic fruit, flowers, matchbox cars, and buttons.
- Allow children to choose from a variety of subjects and draw their own pictographs. Examples might include shapes, flowers, people, faces etc.

Summative Assessment

Students will complete the assessment activity Student Resources 6A and 6B. The Part A is a selected response question that assesses the student's ability to correctly match a tally chart with a given pictograph that depicts the same data. Part B is a constructed response that assesses the student's ability to interpret the data from a pictograph. Answer key can be found on Teacher Resource 5.

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HATS Off TO YOU DAY!

Dear Parents,

It's going to be a great day in our class as we celebrate our creativity and math all at the same time.

Our class will spend two days focusing on the concepts of gathering and displaying data.

Each student can participate by bringing in a favorite hat to add to our collection of data. Our class will use the hats to construct tally tables, and pictographs.

Please encourage your student to be as creative about his/her hat choice as possible. This will add to the many exciting ways that we can gather and record data. Your student will learn so much more about math in a creative and fun way.

Your child should bring in his/her hat on

_____.

The hat will be sent back home on

_____.

Hats off to you,

CHECKLIST FOR TALLY CHART:

_____ **Title**

_____ **Categories**

_____ **Tallies**

_____ **Total**

Key: _____

Name _____

CHECKLIST FOR PICTOGRAPH

_____ **TITLE**

_____ **LABEL**

_____ **SYMBOLS**




_____ **KEY**

NAMES: _____


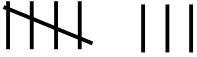

DATE: _____

“Hats Off To You” Assessment

















Part A: Select the tally chart below that displays the data on the pictograph graph.

Where Are the Children?		
	Tally	Total
Hallway		5
Library		4
Bathroom		3

O

Where Are the Children?		
	Tally	Total
Hallway		5
Library		8
Bathroom		3

O

Where Are the Children?	
Hallway	    
Library	       
Bathroom	  

Key: 😊 = one child

Part B:

- Read the pictograph below.
- Write 3 sentences to describe what the data shows.
- How would the pictograph change if the key was changed to ☺ = 2 children?

Where Are the Children?	
Hallway	☺ ☺ ☺ ☺ ☺ ☺ ☺
Library	☺ ☺ ☺ ☺ ☺
Bathroom	☺ ☺ ☺ ☺ ☺ ☺
Reading Room	☺ ☺ ☺ ☺ ☺ ☺ ☺ ☺ ☺
Art Room	☺ ☺ ☺ ☺ ☺

Key 1 ☺ = 1 child

Name _____

Dear Teachers,

Here is a short list of books that you might consider using with the Hats Off To You lesson.

- 1. *The Cat In The Hat* Author: Dr. Seuss**
- 2. *Caps for Sale* Author: Esphyr Slobokina**
- 3. *Aunt Flossie's Hats (and Crab Cakes Later)* Author: Elizabeth Fitzgerald Howard**
- 4. *The 500 Hats of Bartholomew Cubbin* Author: Dr. Seuss**
- 5. *Lost and Found* Author: Mark Teague**

Tally Chart		
	Tally	Total

TALLY CHART CHECK LIST:

_____ **TITLE**

_____ **CATEGORIES**

_____ **TALLIES**

_____ **TOTAL**

PICTOGRAPH CHECKLIST

_____ **TITLE**

_____ **KEY**




_____ **SYMBOLS/OBJECTS**

_____ **LABELS**

“Hats Off To You” Assessment




Part A: Select the tally chart below that displays the data on the pictograph graph.

Where Are the Children?

	Tally	Total
Hallway		5
Library		4
Bathroom		3

















O

Where Are the Children?

	Tally	Total
Hallway		5
Library		8
Bathroom		3

O

Where Are the Children?

Hallway	    
Library	       
Bathroom	  

Key: 😊 = one child

Part B:

- Read the pictograph below.
- Write 3 sentences to describe what the data shows.
- How would the pictograph change if the key was changed to
 $\text{☺} = 2$ children?

Where Are the Children?	
Hallway	☺ ☺ ☺ ☺ ☺ ☺ ☺
Library	☺ ☺ ☺ ☺ ☺
Bathroom	☺ ☺ ☺ ☺ ☺ ☺
Reading Room	☺ ☺ ☺ ☺ ☺ ☺ ☺ ☺ ☺
Art Room	☺ ☺ ☺ ☺ ☺

Key 1 ☺ = 1 child

Name _____